

Concrete Agencies: Transforming Contested Watersheds in Rural Hong Kong

Natalia Echeverri

Lantau Island, the largest in the Hong Kong archipelago, is host to a simmering debate over socioeconomic development and cultural and environmental conservation. Here, large country parks and villages dating back to the Ming Dynasty, sit alongside mega-infrastructure works. This photo-essay illustrates the transformation of a series of Lantau valleys, documenting the concrete and cement artifacts and infrastructures arising from a process that began with Lantau's colonial development and which continues today.

Two subjects are central to this narrative: a meticulously engineered water-diversion project begun in 1956 by the British colonial administration's Public Works Department (PWD), and a more recent network of informal dams, paths and platforms initiated by local residents, which has given rise to a thriving social and recreational space. These contrasting approaches – one marked by formal precision and disruption, the other by improvisation and bricolage – are a story of multiple agencies constructing a

rationalized space against a background of ecology and weathering within a subtropical landscape (Brenner and Schmid 2015). These two sorts of agency can be seen together as a practice of assemblage incorporating not just a series of connected concrete artifacts, but also the material resources, bodies, technical and local knowledge, and types of community (Durose et al. 2022) that are visible in the forms, details and textures documented in the photographs below.



Shek Pik catchwater discharge into the reservoir during the dry season.

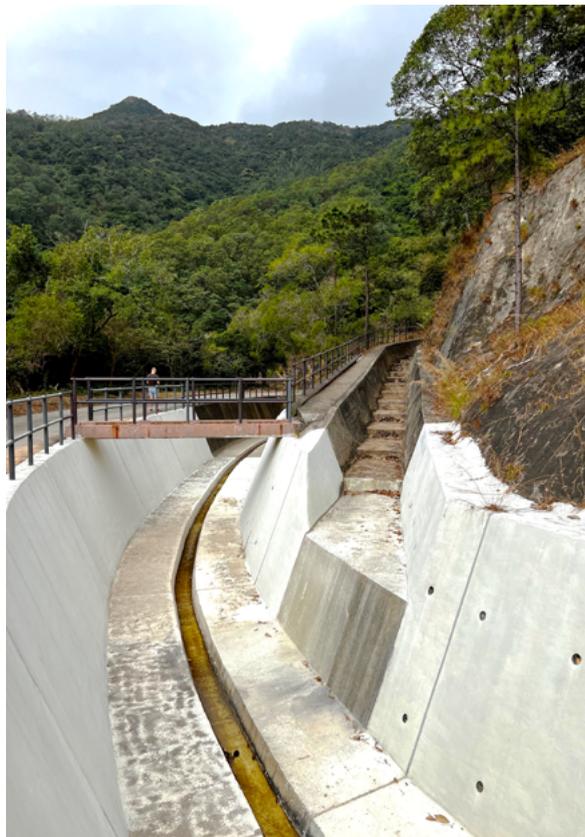
Photo: Natalia Echeverri, 2024.



Two catchwaters divert into a tunnel that distributes the water to the reservoir across a mountain ridge. Artificially engineered slopes of concrete protect the catchment from erosion.

Photo: Natalia Echeverri, 2024.

The Shek Pik Reservoir was the colonial administration's largest and most complex water-diversion project as it attempted to service a rapidly expanding population (Trenerry 1962). The works required novel construction techniques to confront uncooperative landscapes – a frequent problem when infrastructural ambition met with unfamiliar soils in the colonies (Broich 2007). The deep deposits of decomposed granite mixed with alluvial gravels were extremely porous, so engineers developed a solution of injecting cement mortar through interlocked pilings to create an underground cement wall that blocked groundwater flows (Public Works Department 1963). Together with these innovative subgrade works, a network of in-situ concrete water-collecting structures cut across the hillsides to enact a major transformation of the surface watersheds by intercepting water from neighboring valleys and streams, feeding into the reservoir through underground supply tunnels.



Catchwater with secondary stepped channel next to the Southern Lantau trail during the dry season.
Photo: Natalia Echeverri, 2024.

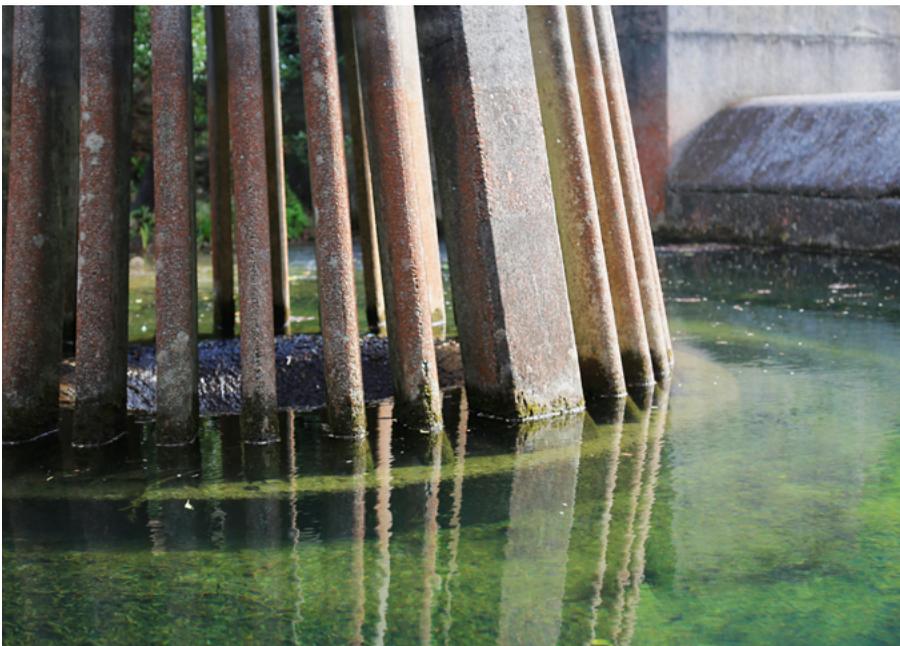
The twenty-one kilometers of catchwater channels feeding Shek Pik reservoir are carved into the hill slopes and lined with smooth concrete trapezoidal cross-sections, capturing surface water runoff before it reaches the sea. Natural streams are drawn into the artificial catchments by concrete weirs and overflow gates. Through points of weathering and algal colonization that disrupt the otherwise monolithic gray bulk, these terminal elements reveal how the original formwork could not be easily resolved against the uneven and rocky terrain. The swinging sluices and control gears set into the concrete structures display moments of human agency in the management of this massive infrastructure (Wang et al. 2018).



Concrete water grate intake in the upper reaches of the Tung Chung River's western stream.

Photo: Natalia Echeverri, 2021.

The stream intakes installed in Tung Chung River and Wong Lung Hang Stream are perhaps even more violent interruptions of Lantau's natural hydrological system. Typical intake structures feature a broad concrete dam cutting across the entire streambed. Waters thus impeded overflow through a prefabricated concrete grate before dropping into covered channels and then into the supply tunnels. The stream intakes, brutal as they are, are also weathered by the continuous flow of water and fine sediments passing over them, their pebbly surface blending into the environment despite their intrusive form.



Detail of a prefabricated conical structure with a water intake set inside.

Photo: Natalia Echeverri, 2023.

The weirs, catchwaters and stream intakes filling Shek Pik significantly altered the natural watersheds in the catchment's lower regions. The Lantau riverine ecology was abruptly fragmented and the critical seasonal flows were lost (Dudgeon 1996). Agricultural villages in the affected watersheds were left without sufficient water and were mostly abandoned within a generation. Resources were reconstituted for urbanized Hong Kong while villages in Lantau, such as Tai O, lacked adequate water supply until the 1970s (He 2001; Greatrex and Mok 2024). Even today, some small and remote villages still rely on wells and traditional rainwater collection (Fung 2014).



22-meter-wide dam with a linear intake intercepts the Wong Lung Hang Stream, leaving a rocky streambed exposed.
Photo: Natalia Echeverri, 2023.

While conserving catchments for the provision of water for human use has protected Hong Kong's upland streams (Dudgeon 1996) under the Country Park Ordinance (AFCD 2023), lower portions of watersheds are constantly modified to accommodate urbanization. In the 1990s, the lower sections of the Tung Chung River and Wong Lung Hang Stream were transformed into open concrete channels to accommodate the Yat Tung Estate, a public housing project for 40,000 residents and an integral part of the Tung Chung New Town project. This development, along with the construction of a new airport, brought significant changes to Lantau.

Despite the hydrological and ecological degradation of streams in Shek Pik's indirect watersheds, these watercourses continue to host new forms of life. Taking advantage of concrete's versatility and availability, some local community members gradually reactivated these streambeds. As explained in December 2023 by a frequent visitor to the Wong Lung Hang Stream, an 80-year-old man with the nickname 'village head' (村長, in Chinese), the history of adaptation has been an ad-hoc but ultimately collective effort. An example is the so-called 'swimming pool', which was first created by unknown hikers who shifted rocks from a shallow water trough to establish the pool's footprint. More than ten years ago, Mr Lau, a nearby resident and construction worker with access to cement, continued these efforts by raising and reinforcing the pool edges with

small amounts of concrete carried bit-by-bit to the site. Eventually, others joined in or donated money or materials as the recreational space gradually emerged from the river.



A community swimming pool. The dam seen in the background divides the pool water from the washing area.

Photo: Natalia Echeverri, 2023.



Bridge made from a wood span and layers of topping cement supports a steady traffic of local residents carrying bottles filled with fresh water.

Photo: Natalia Echeverri, 2023.

Upstream, the concrete adaptations made to the rocky riverbed are more domestic in form. Gathered around a screen of large boulders, concrete is sculpted into hand-smoothed wash basins filled with running water for cleaning fruits and vegetables. Hoses lead from other cemented pools for residents to fill bottles with ease. Rough concrete patches host makeshift tables of wood and brick. The space manifested is both social and utilitarian. We found users for whom this concrete infrastructure of paths, steps and basins facilitates access to a water source that is preferred to government-supplied taps for its better taste and purported health benefits.

A woman washes her fruit and vegetables in a concrete basin while her husband fills empty bottles with fresh water.
Photo: W. K. Yeung, 2024.



However, not all residents are in favor of these informal spaces, and the use of concrete for reclaiming the river is contested. Mr Ho, an elected representative of a nearby settlement, laments the nuisance of litter, noise and stray dogs. He asserts that indigenous villagers have never participated in the illegal construction of ponds or collected mountain water. Other areas feel private, not public. One section of stream, graced with a large shade tree, has been gradually constructed by a Filipina domestic worker who spent the last five years sculpting concrete banks, terraces, benches and tables, gathering sand and aggregate for her mixes straight from the stream. Her air of ownership is projected by how she occupies and maintains the space through concrete works. In contrast, Mr Lau, who helped initiate the swimming pool is no longer willing to build structures along the river as he finds that today people feel he is compromising the natural beauty of the place.



Recently cast concrete texture constructed by Filipina domestic worker who uses concrete to flatten and prevent erosion of a gathering area.

Photo: Natalia Echeverri, 2023.

The concrete and cement adaptations in and along the stream ultimately construct a shared and inclusive space through the negotiation of daily practices and shifting community needs (Durose et al. 2022). Li's (2007: 265) descriptions of assemblage in the context of ecological resource management are useful here and underline the fluidity between seemingly opposed technical and material components of the Shek Pik Reservoir catchments and the Wong Lung Hang Stream modifications. Her notion of "reassembling" indicates the importance of adapting pre-existing systems toward new ends. The pictures here also reveal the nonhuman agents complicit in this reassembling – nature and climate, acting over time, have slowly eroded all the concrete in these systems. Thinned upper surfaces now expose the inner constituent aggregates of their formation. New finishes reveal important functionality, while coverings of moss and lichen pull the concrete back into the underlying geology of Lantau.

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